



*You can not change something just by looking at it.*

## Explore the quantum world at Science Centre Singapore

Find out how technologies from today's atomic clocks to tomorrow's quantum computers depend on the surprising and powerful world of quantum

# QUANTUM: THE EXHIBITION

<b>Exhibition:</b>	QUANTUM: The Exhibition
<b>Date:</b>	19 August 2019 – January 2020
<b>Location:</b>	Hall F, Science Centre Singapore
<b>Opening Hours:</b>	10am – 6pm
<b>Perfect for:</b>	Secondary school students and above
<b>Admission information:</b>	Free* <i>*General Science Centre Singapore admission applies.</i>



## Event Overview

Powerful new computers, unbreakable encryption and sensors that can measure the tiniest shifts in time and gravity: these are some of the many outcomes expected from breakthroughs in quantum technologies. To shine a spotlight on this fast-growing field of research, Science Centre Singapore and its partners present *QUANTUM: The Exhibition*.

The world's first travelling exhibition focusing on quantum science and technology, *QUANTUM: The Exhibition* was developed by the Institute for Quantum Computing (IQC) at the University of Waterloo in Canada. The installation in Singapore includes brand-new exhibits on local research designed to complement the original exhibition.

These new materials are supported by six local organisations with a role in quantum technologies and developed with Science Centre Singapore. The organisations sponsoring the Singapore exhibition are the Agency for Science, Technology and Research, the Centre for Quantum Technologies (CQT) at the National University of Singapore (NUS), Nanyang Technological University, National Research Foundation Singapore, and National Supercomputing Centre Singapore.

The exhibits include a quantum satellite that survived a rocket explosion, experimental devices for quantum computing and an animated introduction to atomic clocks. Visitors will also get to meet a few of the country's inspiring young quantum scientists, profiled in video interviews. Over 30 local experts contributed to the development of the new displays.

"Quantum physics is arguably the greatest intellectual triumph in the history of human civilisation, but its reputation is often one that is mysterious and difficult. With *QUANTUM: The Exhibition*, we hope to make this discipline of science less remote and more relevant, for people of all ages and backgrounds to discover. It has always been our goal to create opportunities for our guests to be inspired by the marvels of science and ultimately push the frontiers of possibilities," said Associate Professor Lim Tit Meng, Chief Executive of Science Centre Singapore.

The project was initiated by the CQT, a research partner of IQC. "We are proud to present *QUANTUM: The Exhibition* alongside our co-sponsors and research collaborators. We hope that Singapore's young people will visit, be excited and be thoughtful about how they will experience quantum technologies in their lifetime. Scientists of my generation are providing the tools to build quantum technologies. It is up to the next generation to discover everything that we can do with them," says Artur Ekert, CQT Director and Lee Kong Chian Centennial Professor at NUS.

Altogether, the interactive exhibition occupies around 4,000 square feet across five different zones. It brings scientific concepts to life through a mix of creative story-telling and gamified experiences. A visitor begins with quantum concepts, dips into the history of computing, and then dives deep into the potential of quantum technologies. Active learners and thinkers will enjoy a journey from the mind-boggling concept of quantum entanglement to the awe-inspiring prospect of quantum computers! In the quantum world, you can change something just by looking at it.



*QUANTUM: The Exhibition* opens a window into this fascinating field of science for people of all ages and backgrounds. It inspires curiosity about the way the universe works and about the exciting impact quantum technologies may have in areas from healthcare to information security.

### Exhibition Highlights

#### **Zone A: Introduction**

Local quantum scientists in a video at the start of the exhibition invite visitors into the quantum world. Visitors enter the exhibition through a mesmerizing tunnel that evokes the feeling of entering the realm of quantum particles. The world is not as it seems.

#### **Zone B: Quantum Mechanics ‘101’**

In this first scientific zone, visitors get a download on the core concepts of quantum mechanics, from entanglement to wave/particle duality. There are hands-on games to help introduce the ideas, including an arcade-style double-slit experiment. Visitors can try making quantum-entangled light particles, operating a locally built device. Once dismissed by Einstein as “spooky action at a distance”, entanglement is a connection between particles that is unaffected by distance. This section also includes a new animation about atomic clocks in Singapore.

#### **Zone C: The Evolution of Information Technology**

Before visitors explore the marvels of quantum technologies, they get a brief reminder of the history of information technology. What is a computer and how does it work? Here there are games to try based on the binary code and the idea of secret messaging. There’s also an introduction to Singapore’s supercomputer, with petascale processing power.

#### **Zone D: Quantum Information Science + Technology**

Armed with knowledge of quantum mechanics and information technology, visitors are ready to explore what happens when we combine the two: more powerful computers, more secure communication and more precise sensing. Local highlights include a collection of experimental quantum computing devices, a satellite that carries a quantum light source built in Singapore, and *Quantum*, a laser artwork inspired by the concepts of quantum computing and entanglement.

#### **Zone E: The Future**

The last zone invites visitors to pen down their thoughts on what a future filled with quantum technologies would look like. The exhibition comes to a close as visitors walk along a timeline of events in Singapore’s quantum history, showcasing the story of the local quantum community’s growth from the 1990s to the present day.

Should you have any questions or wish to find out more about *QUANTUM: The Exhibition*, please contact Christopher/Esther at +65 6222 6136 or at [scb@aka-asia.com](mailto:scb@aka-asia.com).

Exhibition Images



*QUANTUM: The Exhibition* pairs content from a travelling exhibition from Canada with brand-new materials on local research and development, including a timeline of Singapore's quantum history.



The exhibition tells stories of people from the history of quantum physics and, in a new addition, stories of inspiring young scientists working in quantum technologies in Singapore today.



Have you heard of quantum computing? Visitors will learn more about this upcoming technology and other technologies powered by the quantum world at *QUANTUM: The Exhibition*.